September 2, 1961

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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

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METEOROLOGY

World Joins Tiros Plan

➤ THIRTEEN countries and the crown colony of Hong Kong have so far shown interest in receiving weather information from the orbiting United States satellite, Tiros III. Russia is not among them.

Nor have any other Iron Curtain countries answered the U. S. invitation asking 100 countries to participate in a mutual exchange weather program.

Tiros III is taking pictures of the earth's cloud cover between 48 degrees latitude north and 48 degrees south, or as far north as Newfoundland and northern France and covering all of Africa and Australia, and South America as far as southern Chile.

Since England and The Netherlands are north of latitude 48 degrees they will be able to get only very limited information from Tiros III. However, the United Kingdom will take pictures of radarscopes showing cloud cover from several stations while Tiros passes by, as Japan will also.

The Netherlands plans to make observations from the ground, as do Ireland, France, Australia, Japan and New Zealand, the U. S. Weather Bureau told SCIENCE SERVICE. Japan and Australia will take pictures of the whole sky at one time.

Weather photos from planes at times when Tiros III passes will be made by France, Australia and New Zealand. Australia will also launch cameras in high-flying balloons and make special upper air soundings.

An expanded program of upper air soundings will be undertaken by India, Rhodesia, Chad and British East Africa. Special solar radiation studies will also be carried out by the last country and by Ireland.

Portugal, Brazil and Columbia are interested but have outlined no program yet. The British crown colony of Hong Kong has a fleet of merchant ships that will make special observations when Tiros III passes.

Meteorologists from the invited nations have also been asked to come to the U. S. for a workshop between Nov. 13 and 22. The workshop will consist of lectures discussing all the Tiros satellites, past and future (four more are expected in the series), and what they can do. Samples of information from the already launched Tiros will be distributed, and how to use this information will be studied.

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ASTRONOMY

Cometary Space Probe

➤ A SPACE PROBE traveling through the head or tail of a comet in April, 1962, could yield information on the formation and evolution of the solar system.

Dr. P. Swings of the University of Liege, Liege, Belgium, proposed that a far-flying rocket be hurled some 18,000,000 miles into space to investigate the composition of comet Tuttle-Giacobini-Kresak, which makes a "close" approach to earth next April. The probe might even share the orbit of the comet while sending back information by radio, he told the International Symposium on Space Age Astronomy.

Dr. Swings also suggested launching an artificial comet nucleus that would be in a 24-hour orbit, thus remaining visible for long periods of time. A man-made mixture of ice and frozen ammonia and carbon dioxide weighing about a ton could probably last for several days. The addition of meteoritic material to make the artificial comet a more realistic model might change this lifetime.

Such a one-ton artificial comet nucleus in orbit would probably release enough gases to give rise to an observable cometary head, Dr. Swings said. An artificial comet tail would also be formed.

Studies of the man-made comet could yield valuable clues as to the chemical composition of real comets, and thereby clues to the solar system's origin.

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SPACE

Space Telephone by 1962

➤ BY LATE 1962, telephone conversations and telegraph messages will be relayed by way of an "active" communications satellite in a 24-hour orbit 22,300 miles above the earth, if present plans are successful.

The 50-pound experimental space craft will be built by Hughes Aircraft Corporation for the National Aeronautics and Space Administration as part of Project Syncom. When placed in an orbit synchronous with the rotation of the earth, the satellite would move in an elongated "figure eight" pattern 33 degrees north and south of the equator over a given longitude near the east coast of the U. S.

The satellite will be boosted to the 22,300-mile orbit by a three-stage Delta vehicle. Then it will be injected into the desired orbit by an additional solid propellant rocket attached to the space craft.

An "active" communications satellite carries equipment to rebroadcast the messages it receives, whereas "passive" ones act as high-flying "mirrors" from which the messages are bounced back again toward earth.

Two other active satellite projects—Relay of NASA and TSX of American Telephone and Telegraph in cooperation with NASA—will test low-altitude systems at up to 3,000 miles. The Department of Defense, using Project Advent facilities, will participate in Project Syncom by furnishing ground stations and performing communications experiments.

Syncom test results will be made available to communications interests, commercial and governmental, around the world. Early Syncom satellites will not have instruments to handle TV band widths. Frequencies used will be 8,000 megacycles from ground to satellite and 2,000 megacycles from satellite to ground.

The Hughes contract, now under negotiation, calls for at least three flight units at approximately $4,000,000. The program will be managed by NASA's Space Flight Center at Greenbelt, Md.

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SPACE

Ranger Satellite Whirls In Unplanned Earth Orbit

➤ THE RANGER I satellite is now whirling through space transmitting information of "questionable" value from an unplanned near-earth orbit far short of its original goal. (See SNL, 80:85, 1961)

The complex satellite, instrumented to probe the mysteries of the cosmic rays and radiation 685,000 miles in space, swung into an orbit from 105 to 312 statute miles above the earth.

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ASTRONAUT TRACKER—Antenna array, built by the Bendix Corporation, New York, is used to find and track the manned Mercury spacecraft, receive telemetered information on 90 channels and maintain two-way voice communication.

GEOPHYSICS

Dates by Magnetism

The magnetism of cooking hearths of past ages gives the dates of ancient events. Changes in the earth's magnetic field are used as a measuring stick.

➤ THE EARTH'S magnetism in the baked earth of cooking hearths of past ages dates human events of prehistory and gives archaeologists a time index, the Tenth Pacific Science Congress in Honolulu was told by Dr. Naotune Watanabe, anthropologist of the University of Tokyo.

Burned clays are permanently magnetized in the direction of the earth's magnetic field in which they were cooled from a high temperature. This can be measured like the deviation of a compass needle. Because the earth's magnetism changes in direction with the years, this effect can be used in dating. Lava flows from ancient volcanoes are affected similarly and the flows can be used to give a calendar of magnetic variations that can be applied to the ancient camp fires of past peoples.

Dr. Watanabe applied to archaeological sites the magnetic method used by geophysicists on lava flows and other igneous rocks. From baked clay samples of various ages in Japan during the past 6,000 years, he determined that the earth's magnetic field seems to have undergone a secular variation within the range of 40 to 60 degrees in inclination and 20 degrees east and 30 degrees west declination for at least that time in that country.

He built standard scale of secular variations for the past 1,700 years, which is based on dated lava flows, and can be used to date archaeological finds.

Studies are now being made to connect the magnetic dating with radiocarbon and other methods of dating the past.

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Heat in Antarctica

➤ THE AMOUNT of heat flowing into the Antarctic each year by wind is seven to ten times greater than the amount carried in by water vapor.

The heat transport per year amounts to 2,000 times the electrical energy produced in the United States in 1957, Morton J. Rubin, chief of the U. S. Weather Bureau's polar meteorology research project, told the Pacific Science Congress in Honolulu. His calculations are based on meteorological and glaciological data gathered during and after the International Geophysical Year.

Since water vapor and wind are the only means by which any appreciable amounts of heat are carried into the Antarctic, the sum of the latent heat and the measurable heat gives a good estimate of the heat lost by radiation through the top of the atmosphere. Mr. Rubin's calculation of radiation loss is 15% lower than previous estimates. This energy loss will be measured directly by the Nimbus weather satellite to be launched sometime in 1962.

Mr. Rubin said that, as part of the survey, the first map of the average annual precipitation in Antarctica was drawn, showing it to be about six inches per year.

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Passage Under Ice Cap

➤ A DEEP PASSAGE buried beneath tons of ice cuts across the Antarctic continent linking the Ross Ice Shelf with the Amundsen Sea.

Lying as much as 7,500 feet below sea level and under 12,000 feet of ice, the passage disappears just short of the Bellingshausen Sea, nearly 1,000 miles away from the Ross Ice Shelf. The passageway was discovered by University of Wisconsin scientists during a traverse across the frozen continent.

Part of the embayment actually veers off and continues toward still unexplored regions of the Antarctic, Dr. Charles R. Bentley, University of Wisconsin geophysicist, told the Pacific Science Congress meeting in Honolulu.

Recent traverses have also pinpointed the exact location of many West Antarctic mountains, the scientist noted.

"New mountains have been discovered and many previously shown on maps have been moved or removed entirely," he said.

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Fish Odor Isolated

➤ CANADIAN SCIENTISTS have isolated a substance that helps give fish their odor.

Dr. Herman Kleerekoper and co-workers at McMaster University separated an amine, an active substance, from the scent of trout. The substance was added to water containing a sea lamprey, causing a sudden burst of activity as the lamprey searched for its prey.

Scent substances given off by fish occur in such small quantities that thousands of gallons of water have to be processed in order to isolate and identify them. This amine, the most active substance, was prepared in crystalline form, Dr. Kleerekoper told the Pacific Science Congress in Honolulu.

The action of the amine on sea lamprey was studied with an automatic recorder in McMaster University laboratories, Hamilton, Ontario, Canada. The Canadian scientist hopes the identification of scent substances will shed light on the relationship between predator and prey, and the role of smell in fish migration and fish schools.

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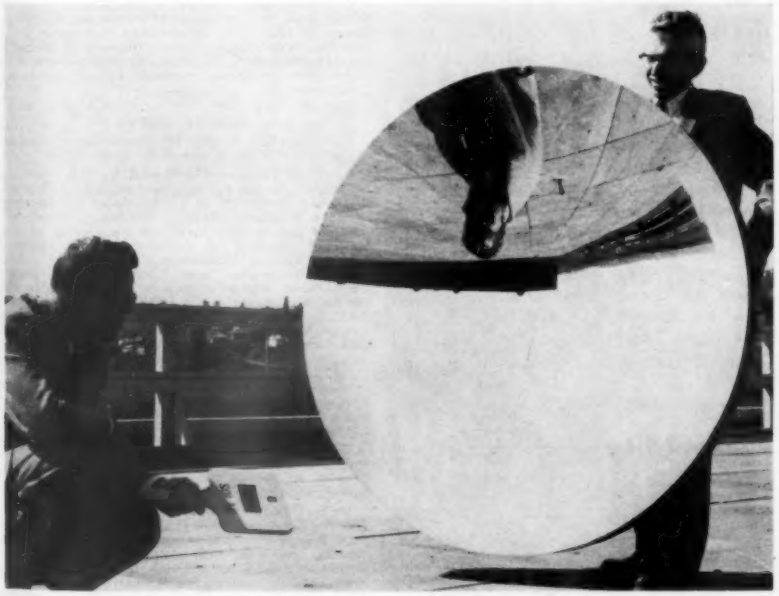
Effective Shark Repellent

➤ THE MOST effective repellent for sharks is a nigrosine dye that makes the water around a swimmer black and opaque, Dr. Perry W. Gilbert, Cornell University, Ithaca, N. Y., reported.

This method of preventing shark attacks, he told the Tenth Pacific Science Congress



SPACE MIRROR—A prototype solar concentrator, developed by the Boeing Aero-Space Division, Seattle, Wash., may be used to convert the sun's heat to an electric power source for long space flights.

in Honolulu, is effective except when sharks enter into a "feeding frenzy."

Although sharks can readily distinguish an object against a contrasting background in either bright or dim light, they can neither clearly discern the details of the object nor its color, Dr. Gilbert explained.

In experiments sharks had their vision interrupted by black plastic shields over each eye, and their ability to smell was obliterated temporarily by plugging each olfactory sac with cotton soaked in an anesthetic, pontocaine. At distances greater than 100 feet, smell is more important than vision in guiding sharks to prey.

At distances of 100 feet or less, depending on the clarity of the water and amount of light, vision increases in importance. At very close range of ten feet or less, vision is probably the principal sense involved in directing a shark to its target. When both vision and olfaction are obliterated simultaneously, an adult Negaprion swims helplessly about, injures itself seriously, and dies within three to five days.

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ENTOMOLOGY

Insects Fight Insects

➤ INSECTS are fighting insects at man's instigation in 221 cases throughout the world in about 65 countries.

Dr. Paul DeBach of the University of California, Riverside, told the Tenth Pacific Science Congress in Honolulu that there are 123 more or less successful cases of biological control of insect pests by natural enemies imported into 23 areas in the Pacific. This setting of insect against insect has made it possible to continue to grow major crops over extensive areas that otherwise would have been deprived of important agricultural production.

Entomologists seek out the natural insect enemies of other insects in various parts of the world and then propagate them in areas where it is desired to control the destructive insect. In many cases it has been possible to bring about biological control by means of insects without resorting to costly insecticides.

Dr. DeBach, analyzing the 123 cases of biological control of test insects in the Pacific areas, found that 65 of these were effective on islands and 58 on continents. Some of the natural enemies of insects put to work on control in other than their native areas are parasites, some are predators, others use a combination of both. The parasites outnumber the predators.

More research and importation of insects for biological control was urged by Dr. DeBach since he says that the number of successes obtained is proportional to the effort that is made in this way. He urged the scientists at this Pacific Science Congress to emphasize biological control efforts just as similar congresses did in 1924 and 1939.

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ARCHAEOLOGY

Pacific Peopled Earlier

➤ THE PACIFIC ISLANDS were peopled several hundred years earlier than previously believed. This was revealed by radiocarbon dating determinations reported to the Tenth Pacific Science Congress in Honolulu by Dr. Richard Shutler Jr., archaeologist at the Nevada State Museum, Garson City, Nev.

More than 100 specimens from various parts of the Pacific area were dated by measuring the present radioactivity of carbon isotope-14 in them and thus determining their age.

The inhabitants of the south China Coast had seagoing vessels by 2000 B.C. From this area the ancestors of the future occupants of the Pacific left, following at least two routes: Through the Philippines into Micronesia, and through Indonesia into Melanesia. Long human occupation in the East Indies is indicated by a radiocarbon date of 39,000 years from the Niah Caves, Sarawak. The wanderers arrived in the Marianas Islands by 1500 B.C., and Yap by A.D. 178. Those who took the Melanesian route arrived at New Caledonia by 800 B.C., and Fiji by 46 B.C.

Samoa was occupied by A.D. 9, Easter Island by A.D. 400, Marquesas by 122 B.C., New Zealand by A.D. 1000, and Hawaii by A.D. 124. The dates are fairly consistent with the "line of march," and are not out of line with the distribution of adzes and linguistic evidence.

Dr. Shutler stated "that a major contribution of radiocarbon dating to Pacific archaeology has been to show that the early conceptions of the time of migrations into this area were wrong by several hundred years, being much earlier than anticipated."

Cosmic radiation bombarding nitrogen in the earth's upper atmosphere continually creates radioactive carbon of atomic weight 14 which is washed by rains to earth and accumulates in all living things. The rate of radioactivity, which decreases with time, tells the age of once-living objects.

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Personality and Society

➤ THE WAY children are reared in a certain kind of civilization may affect their personalities and even diseases they will have in later life.

As a part of a world-wide investigation by medical scientists, anthropologists and other experts, the Tenth Pacific Science Congress in Honolulu heard reports of effects of culture in Okinawa on personality.

Okinawa in the Ryukyu Islands near Japan is one of the areas in which a long-continued study is underway. The other regions are New England, India, Mexico, the Philippines and Tegusa in Africa. This research is under the direction of the Harvard Graduate School of Education.

In such inquiries, for example, it is found that under polygamy the mother plays a dominant role and the child may not see his father for years. The experience of breaking away from the family in such a culture is different from that experienced by a child in a culture where monogamy is the custom and the father and his influence are present.

Even the form of government and the educational system have been found to affect the lives of people under various cultures.

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EDUCATION

Hits Language Problems

▶ LANGUAGE DISORDERS, often "unrecognized, misdiagnosed or misunderstood," are causing many intelligent children to fail in school and be called forgetful, lazy and stubborn at home, according to a U. S. Office of Education specialist on speech and hearing.

Dr. Nancy E. Wood calls it "shocking" that children with communication problems affecting their ability to speak, read and write are "almost completely forgotten" in educational planning. Such children do not have "a fair chance for an education," she maintains.

She cites three major disorders.

A child with aphasia, a speech problem, may be a fluent talker, but has difficulty choosing the right word for what he wants to convey. He may, for example, be unable to use "bookcase" and resort to saying "the place where books are kept" instead. These "severe word-finding problems" are "confusing to the listener and embarrassing to the user."

With alexia, a reading problem involving memory or recall, a child fails to associate written words with what they describe. He may be unable to give an account of what he has just read, either aloud or silently. He may reverse words, seeing "saw" for "was," "ton" for "not," or "won" for "now."

With agraphia, a writing problem, a child is unable to associate words he writes himself with what they symbolize. He may be unable to identify individual letters after writing them. He has trouble with his spelling.

Other behavior traits, added to poor classroom work, may provide significant clues in diagnosing disorders. The child may assume unusual postures when reading or writing. He may spend much time daydreaming. He may talk excessively and compulsively without really communicating, as if to "fill every void in the conversation with verbalization so that (he) will not have to respond to talk from others."

In all such disorders, Dr. Wood writes in School Life, 43:5, 1961, the Office of Education journal, causal factors are more important than symptoms, both for diagnostic purposes and for choosing proper corrective programs. The disorder may be part of a multiple problem, linked with mental retardation, hearing loss or emotional disturbance.

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GENERAL SCIENCE

Young Scientists Cruise

▶ YOUNGSTERS whose scientific projects were honored by the U. S. Navy this year joined seagoing units for a five-day cruise and a first-hand look at Navy science in action, afloat and ashore.

The high point of the fourth consecutive annual Navy Science Cruiser program began Aug. 19 for part of the 211 winners picked from high school youths who exhibited at the 1961 National Science Fair-International and earlier regional fairs. SCIENCE SERVICE coordinates the regional fairs and conducts the national event.

The East Coast cruises for 104 students from Aug. 19 to Aug. 26 were based at Mayport, Fla.; Norfolk, Va.; Panama City, Fla.; Newport, R. I., and Charleston, S. C. The only embarkation point on the West Coast, from which the remaining 107 cruisers sailed on Aug. 26, was San Diego, Calif. The West Coast group returns home Sept. 2.

The Naval Air Reserve Training organization's "weekend warriors," headquartered at Glenview, Ill., flew the boys from airfields near their homes to the coastal cruise bases.

In addition to their "sea duty," the 211 junior scientists toured Navy laboratories, meeting scientists and technicians for seminars and informal discussions. The West Coast contingent visits the electronics laboratory at San Diego.

In previous years the cruises were conducted in late September and early October. The late summer scheduling served the dual purpose of preventing loss of school time by the students and enabling them to join Navy midshipmen on their regular training cruises. It also enabled high school seniors to join the cruises for the first time. The Navy program, designed to encourage the Nation's youth to develop a more active interest in science," began in 1946 and was given its present status as a continuing program in 1958.

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TECHNOLOGY

New Computer Called "Fastest Ever Built"

▶ A DIGITAL computer described as "the fastest ever built" is now in use at Lincoln Laboratory, Lexington, Mass., a research center operated under Air Force contract by the Massachusetts Institute of Technology.

Called the FX-1, the computer is modest in size but notable for high operating speed. Lincoln technicians believe it may be the forerunner of "a new generation of machines, ten times faster than any computers in general use today."

The FX-1's "read-write cycle time"—the time needed to read a computer word out of the main memory and write in a new one—is three-tenths of a microsecond. The fastest older models took two to 12 microseconds.

The "clock rate," or timing pulse rate of the FX-1's logic circuits, is 50,000,000 pulses per second, four times the rate of the fastest commercial machine previously reported.

The working model was designed to test both fast logic circuitry and magnetic film storage. The computer is the first with a main memory using thin magnetic films instead of ferrite cores for high-speed, random-access storage.

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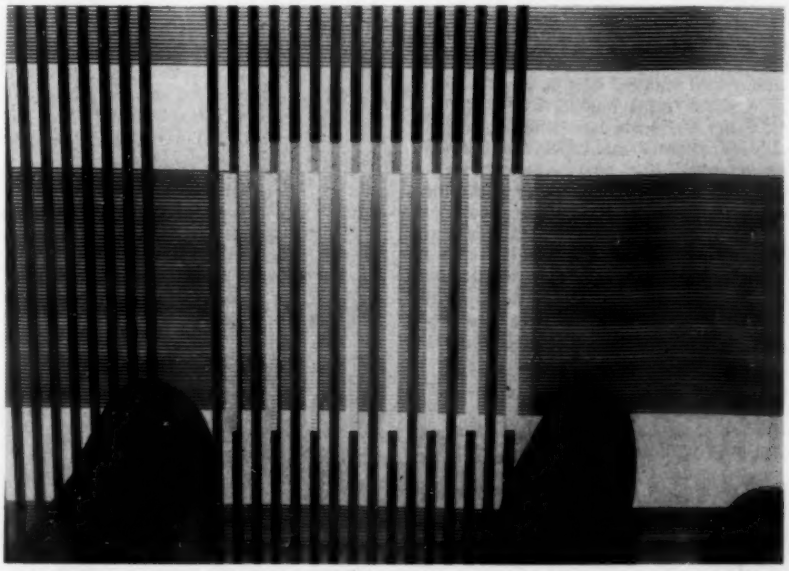

MEMORY ELEMENTS—Glass plate with small rectangular magnetic-film memory elements is being placed on the printed-circuit wiring assembly of the high-speed main memory in the FX-1 computer.

MEDICINE

Man Revived Five Times

➤ A 67-YEAR-OLD man who was revived five times within two hours after his heart stopped beating at Georgetown University Hospital in Washington, D. C., owes his life to a new machine called a cardiactivator. It massaged his heart externally, causing the blood to flow again.

Lester T. Garrison, a retired employee of the U. S. Department of Agriculture living in Vienna, Va., was admitted to Georgetown about the first of August with a dilated aorta, the major artery leading from the heart. Drs. Charles A. Hufnagle and Peter W. Conrad treated the aneurysm, but soon after the patient was admitted, he had a coronary attack that completely stopped his heart not once but five times.

The cardiactivator was new to the hospital. It had been tried only once before on a heart patient who was too near death to be saved.

The machine has an advantage over the hand method of external heart massage in that it can control the amount of pressure needed to attain the blood pressure desired for the patient.

In the case of Mr. Garrison, who is slowly improving in the hospital, the amount of pressure exerted was 70 pounds per square inch. A dial was set for this desired amount of pressure, and a green light flashed each time the indicated amount was applied to the bottom of the breastbone.

The inventor of the cardiactivator is W. J. Mullikin, a resident of Washington. Other inventions of his that have been successful are the Mullikin portable iron lung machine, developed in 1949, the wheel chair respirator and portable radio-operated traffic signals.

Mr. Mullikin told SCIENCE SERVICE he has been working on the cardiactivator for more than two years and had applied for a patent. He is particularly interested in production of a portable model weighing 22 pounds, which he hopes to introduce for ambulance use.

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MEDICINE

Measured Heart Damage

➤ A RELATIVELY simple and accurate test for heart damage using only a small sample of a patient's urine has been developed at the University of California, Los Angeles Medical School.

Drs. Robert B. and Richard W. Kalmansohn, brothers, developed the procedure which they call the urine glutamic oxalacetic transaminase (UGOT) test. The test may also measure the rate of repair of heart damage.

Glutamic oxalacetic transaminase (GOT) is an enzyme that apparently plays an important but not too well understood part in amino acid metabolism. It is particularly abundant in heart muscle.

During the acute heart muscle damage, called myocardial infarction, that follows a heart attack, the enzyme leaks out of damaged heart cells and appears in high concentration in the blood. Its activity is generally proportional to the amount of heart damage.

Several years ago the serum transaminase test, which measures GOT in blood serum, was developed. Since that time it has been used in diagnosis of myocardial infarction.

In recent years a number of researchers had attempted to develop a simpler transaminase procedure with urine. However, the fact that the activity of this enzyme rapidly disappeared on standing at room temperature presented a problem.

The Kalmansohn brothers found that if the urine sample were refrigerated immediately after it was taken, the GOT persisted for at least two days. Thus the sample would be suitable for GOT determination.

They ran UGOT tests on 17 consecutive patients with acute myocardial infarction proved by electrocardiogram and other conventional diagnostic procedures. These were compared with UGOT tests from 59 healthy control subjects.

GOT levels in the urine of the myocardial group were from two to five times higher than in the controls. It was also found that GOT levels started rising in urine eight hours after a heart attack, about the same as serum levels, but the urine levels may remain high longer than the serum levels.

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MEDICINE

Live Vaccine Licensed

➤ THE LONG-AWAITED first licensing of the live oral poliovirus vaccine developed by Dr. Albert B. Sabin of Cincinnati, which was announced by the U. S. Public Health Service in Washington, D. C., marks another advance in the conquest of a disease that now has been reduced to a minor status.

As expected, Chas. Pfizer & Co., Inc., New York, will distribute vaccine exported to this country by Pfizer Ltd., its English company located in Kent County.

The vaccine is available free, if needed, at Government expense.

Only 900,000 doses have been contracted for (at nine cents a dose) and this vaccine is effective only against Type I polio, the most common of the three types. Type III was found in Atlanta, Ga., recently, and Dr. Sabin provided enough of the Cincinnati batch of Type III vaccine to prevent an epidemic in the southern city. Other pharmaceutical companies expect to have all three types of oral vaccines ready by the 1962 polio season.

Dr. Luther L. Terry, Surgeon General of PHS, said he expected Type II vaccine to be licensed "in the near future" but that it would be several months at least before Type III would be ready for licensing.

Congress appropriated a million dollars last spring because President Kennedy requested that all three types of oral vaccine be purchased for the control of possible epidemics. With a part of these funds, the Type I vaccine is being purchased in frozen state to be held in reserve by the Communicable Disease Center in Atlanta.

State and Territorial health officers will answer local requests according to these requirements: At least three cases of polio in the community within a month must be reported, of which two have been confirmed by laboratory analysis to be Type I.

Adequate community organization and medical leadership must be guaranteed to insure rapid coverage of the population under 50 years of age. The community must agree to make the vaccine available without charge to persons under 50.

Only 363 polio cases have been reported for the first 31 weeks in 1961, compared to 948 cases for the same period in 1960.

Salk killed vaccine is recommended by the Public Health Service during the present season at least, as this vaccine will protect against all three types of polio.

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BIOLOGY

Change Proposed in Sex-Determination Ideas

➤ AN INDIAN YOUTH of 20 has doctors in a quandary because he is neither male nor female. His abnormality is a previously unknown form of intersex.

Doctors studying the case have proposed the idea that factors other than sex chromosomes strongly influence sex development in the unborn child. Their chief evidence is the youth, whose chromosomes are those of a normal female, but whose anatomy is both male and female.

With one possible exception, all previous cases of this type of abnormality have had male sex chromosomes in the body cells, and this factor was believed to be the difficulty.

The youth was reared as a male, the scientists report in the British Medical Journal, Aug. 19, 1961, and is "the first chromatin-positive individual in whom both gonads, on detailed sectioning, proved to be testes and whose sex chromosome constitution is apparently that of a normal female."

The study is reported by Dr. Prabhaker N. Shah, S. N. Naik, D. K. Mahajan, M. J. Dave and J. C. Paymaster, all of the Indian Cancer Research Center and Tata Memorial Hospital in Bombay.

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PSYCHOLOGY

Allow Patients to Talk

➤ A FEATURE of Freud's work that general practitioners are advised to adopt is the method of treatment that allows patients to "talk things out."

This feature of the famous psychiatrist's work would have more permanent significance for the medical profession than his "theory of libidinal determinism," Dr. John C. Whitehorn of Johns Hopkins University School of Medicine, Baltimore, believes. The libido, or sexual desire, is usually considered as predominant in Freud's theories.

Dr. Whitehorn reports in The New England Journal of Medicine, 265:301, 1961, that the "whole idea of a conversational method of treatment sounds more like a golf pro correcting a client's slice or hook than a doctor curing a disease."

However, Dr. Whitehorn explains that diseases of "functional origin, that is, states of disability and distress" that arise from the disease-causing aspects of human beings in such states are comparable to the golfer's hook or slice.

In the behavior of the mentally disturbed sick person, he states, one can find evidences of misguided and faulty approach to some life problem. The physician, like the golf pro, who is successful in his approach, does not merely demonstrate the way to do something, but gives professional guidance in showing misdirected effort.

Dr. Whitehorn holds up to physicians in general an image of man "as a social being," and deplored the tendency of the medical profession to picture society as a "special bogeyman, Socialized Medicine."

The psychiatrist points out the difficulties of many patients in accepting the "leadership of the physician" and says the physician who was most successful in treating patients with mild disturbances were those who avoided being domineering in their conversation, calling out the patient's cooperation and exploring his needs.

Dr. Whitehorn believes his image of man is more nearly true to life than the "physicochemical model or the rather mechanical instinct model that has in recent decades captured medical attention." Combining theory with intuition and common sense is a useful viewpoint, he states.

• Science News Letter, 80:151 September 2, 1961

NUTRITION

Cure for Animal Muscle Deterioration

➤ THE QUOKKA, a marsupial resident of Rottnest, an island off the coast of Western Australia, has been subject in captivity to a hitherto fatal deterioration of the muscles.

Dr. Raymond Adams of the Harvard Medical School, Boston, and Dr. ten Seldam of the University of Western Australia, Perth, decided the condition could be due to a dietary deficiency of vitamin E. Nine quokkas were treated with a chemical that duplicates some of the characteristics of vitamin E.

Muscle biopsies performed at intervals of from one to eight weeks showed that eight of the animals had little or no evidence of muscle lesion, depending on the period between biopsies.

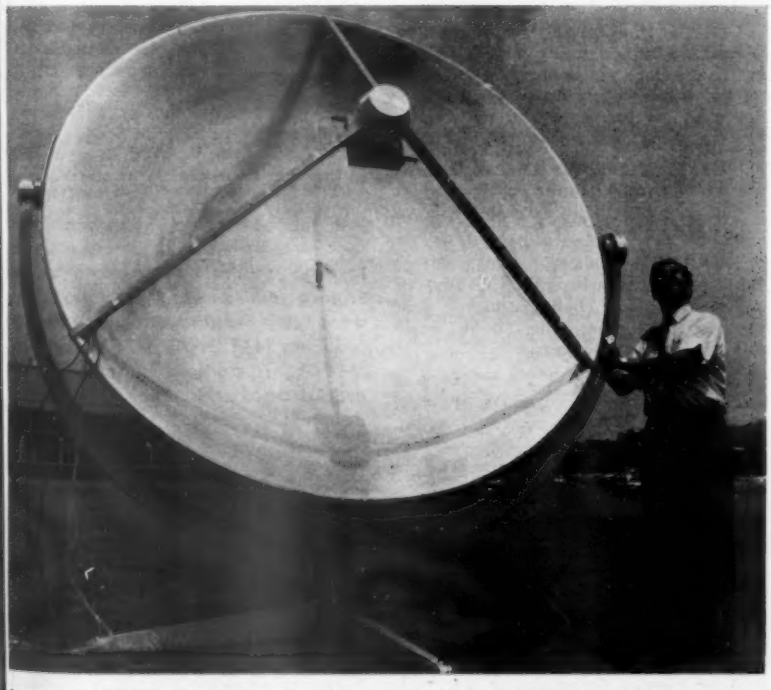
Clinical recovery was complete in all nine quokkas in from two to three weeks, Dr. B. A. Kakulas of the University reported in Nature, 191:402, 1961.

• Science News Letter, 80:151 September 2, 1961

TECHNOLOGY

Sun-Powered Generator

➤ A SUN-POWERED generator, converting solar energy directly into electricity to operate a motor-driven water pump, may raise living standards in underdeveloped areas by providing water for land irrigation and household needs.



SOLAR POWER PLANT—A solar-powered thermoelectric system converts the heat of sunlight directly into electricity. Made by Westinghouse Electric Corporation, Pittsburgh, Pa., the unit is proposed as a pumping system to provide water for nonmechanized countries.

A prototype 50-watt power plant and pumping unit has been built and tested by researchers at Westinghouse Electric Corporation, Pittsburgh, Pa., working with scientists from the Solar Energy Laboratory of the University of Wisconsin.

A saucer-shaped mirror focuses sunlight on the small, box-shaped generator, which has one side painted black to absorb solar heat at high rates. Inside the box are 72 thermoelectric couples that generate electricity when the black side is heated to a higher temperature than the other side.

The hot side of the generator runs at an operating temperature of 840 degrees Fahrenheit and the cool side at 150 degrees Fahrenheit. The motor and the pump are the only moving parts in the experimental irrigation system.

A larger unit, able to deliver up to 200 watts of power, is being built. This model is expected to be able to pump enough water from a 20-foot depth to irrigate four acres of land, at the rate of 24 inches of water annually, or supply the personal needs of 1,200 persons, each using five gallons daily.

For this amount of water, the 200-watt system would operate ten hours daily for 250 days of the year, leaving a one-third safety margin for cloudy weather when the generator could not operate.

Two-thirds of the world's people live in areas that have sunshine at least 75% of the time, Dr. S. W. Herwald, vice president of the Westinghouse research section, noted.

Kurt Katz, senior engineer at the Westinghouse new products laboratories, reported on the thermoelectric generator at the United Nations Conference on New Sources of Energy, which opened Aug. 21 in Rome, Italy.

• Science News Letter, 80:151 September 2, 1961

October
SCIENCE YOUTH MONTH

America must have qualified scientific and technological manpower and brainpower. National Science Youth Month turns the spotlight on career opportunities for the youths who make up the nation's vast reservoir of potential talent.

Millions of young people in schools, science clubs, and science fairs across the nation form the core of this month-long emphasis on science activities.

Check YOUR Action Program . . . NOW

☐ NOW . . . Organize a **local National Science Youth Month Committee** to plan a full-scale program for making the month a rousing success in YOUR community.

☐ NOW . . . Get **information material** ready for October use. Prepare announcements and news releases for newspapers, radio, television. See that the information gets to ALL interested organizations and individuals—schools, teachers, industries, colleges, scientists, engineers.

☐ NOW . . . Help your school schedule an October **Parent Teachers' Association meeting** devoted to science youth activities—science clubs, science fairs, projects, hobbies, etc.

☐ NOW . . . Ask all professional and technical societies to devote **one October meeting** to science youth power.

☐ NOW . . . Stock your career guidance shelf with **up-to-date literature** on career opportunities in science, mathematics, engineering.

☐ NOW . . . **Subscribe** to magazines and journals covering science and mathematics. **Enter or renew** memberships in professional societies.

☐ NOW . . . Organize **plant tours** for the coming school year. Check with plant officials and school administrators so that convenient times can be arranged for everyone concerned.

☐ SEPT. 15 . . . Teachers in secondary schools—get your science group, club or class **affiliated** with **Science Clubs of America.** It's simple. Just write Science Service—"Affiliate our club." You get a valuable free sponsor handbook.

☐ OCT. 1 . . . Urge **newspapers, radio-TV outlets** to stress science news, play up science youth power, during NATIONAL SCIENCE YOUTH MONTH.

☐ OCT. 1 . . . **Reorganize** for **science fairs** slated for next spring. Reactivate your committees and start planning. If you have not had a fair, organize one. Get cooperation from colleges, industries, medical societies, service clubs, newspapers, others.

☐ OCT. 15 . . . Ask for **Science Talent Search examinations** for your most promising seniors. Examinations will be mailed November 15.

☐ DURING OCTOBER . . . Hold science club **"career sessions."** Ask local or area scientists and engineers to tell your members about opportunities, needs, qualifications, for science careers.

☐ DURING OCTOBER . . . Set up a **workshop clinic** for teachers, students, others interested. Swap ideas on getting projects started, working with students on their individual projects.

☐ DURING OCTOBER . . . Have a **Project Night.** Invite professional scientists, engineers, to a mass meeting of young scientists. Get the eager beginners and the "old pro's" working together.

☐ DURING OCTOBER . . . Sell your school on a **special assembly** geared to NATIONAL SCIENCE YOUTH MONTH, with speakers from science fair organizations, proclamations and messages from local, state, national officials.

☐ NOW AND ALWAYS . . . **Let people know what you are doing.** School papers, local dailies and weeklies, radio-TV stations, all **want** news; when an event is newsworthy, see that they get an account of it. And send your ideas to Science Service, 1719 N Street, N.W., Washington 6, D.C., so they can be passed on to others.

Listed below are the organizations that have joined with Science Service to organize this national emphasis on science youth power. The National Science Youth Program of Science Service, including NATIONAL SCIENCE YOUTH MONTH, is partially supported by a grant from the National Science Foundation.

SCIENCE PAVES PATHS TO PEACE. TODAY'S YOUTHS ARE TOMORROW'S SCIENTISTS

Cooperating in National Science Youth Month:

American Association for the Advancement of Science

The AAAS administers a Traveling High School Science Library Program and a Traveling Elementary School Science Library Program, sponsored by the National Science Foundation, to stimulate interest in and choice of careers in science and to assist in improving school instruction in the sciences and mathematics. These libraries are on loan in 1961-62 to approximately 1,000 high schools and preparatory schools, 800 elementary schools and 75 public libraries. Address Dr. H. J. Deason, AAAS. Annotated catalogs of the traveling libraries are available at 25c each. Also available are an annotated list of paperbound science books (25c); and a comprehensive list of science books recommended for high school and public libraries; one for elementary school libraries ($1). Send orders to AAAS Publications. Under a grant from the Carnegie Corporation of New York, the Science Teaching Improvement Program of AAAS is sponsoring a project on Studies in Teacher Education with the cooperation of Bucknell University, Emory University, Hunter College, Oklahoma State University, San Francisco State College, University of Arizona, University of Delaware, University of Hawaii, and University of Tennessee. During the past 2 years small research grants have been made available to staff members in small colleges. A requirement of the research project is that it involve preservice science teachers. A quarterly newsletter, called *Science Education News*, reports education activities of scientific societies. Junior Academies of Science are encouraged through AAAS-affiliated State and City Academies of Science. A Junior Scientists' Assembly is sponsored each year at the annual meeting by the Academy Conference. Grants are given for student projects through the Senior Academies. AAAS, 1515 Massachusetts Ave., N.W., Washington 5, D. C.

American Cancer Society

The ACS is carrying out an active career-incentive program. A number of ACS Divisions have provided special training grants for careers in medical technology, and have granted other types of scholarships relating to career training in some instances. ACS provides free teaching aids and informational materials on cancer to science teachers and information to students upon request to the local units of the Society.

American Chemical Society

ACS members volunteer to give personal assistance to high school science teachers. ACS presents four awards at the National Science Fair-International and many local sections sponsor award programs. The ACS Division of Chemical Education constructs, standardizes and distributes tests in high school chemistry and various fields of college chemistry. The Division also publishes the *Journal of Chemical Education* which is a monthly journal of great value to students, teachers and scientists. The ACS initiates conferences and institutes in chemistry. Over 160 local sections are active in educational activities of various kinds. More than 370 student affiliated chapters in colleges and universities actively engage in programs designed to better prepare students for careers in chemistry. For further information about careers in chemistry, summer employment, speakers, consultants, etc., consult local section officers or the National Office—American Chemical Society, 1155 16th St., N.W., Washington 6, D. C.

American Dental Association

All state and local dental societies are being urged to participate in science fair activities. Dental societies and dental schools are prepared to offer advice and material assistance to science teachers and students. The ADA presents awards for outstanding exhibits at the National Science Fair-International. A booklet, *Dental Projects for High School Science Students,* is available without charge from many local dental societies; single copies from Science Service (25c for single copy; 20c each for 10 or more). Dental health and hygiene information described in the Catalog of the ADA (single copy on request) provides some additional background material for science projects. For information and names of local dental society officers, write to Dr. Sholom Pearlman, American Dental Association, 222 E. Superior St., Chicago 11, Ill.

American Federation of Labor and Congress of Industrial Organizations

The AFL-CIO supports better schools and encourages scientific education. Many of its affiliated unions conduct apprenticeship schools to transmit skills to young apprentices and the latest scientific processes to journeymen members. Central labor organizations and local unions of skilled workmen in almost every community stand ready to help pupils with their science projects, clubs and fairs. Students wanting assistance are invited to contact the local union bodies in their home towns or write AFL-CIO Coordinator of State and Local Councils, 815 16th St., N.W., Washington 6, D. C.

American Heart Association

The AHA is encouraging its affiliates and chapters to cooperate with local, regional and state science fairs. For educational materials relating to heart and blood circulation, fair directors should contact their local Heart Associations.

The American Institute of Biological Sciences

The AIBS has several educational activities of interest to high school teachers. The Biological Sciences Curriculum Study (BSCS) is being directed at the secondary level but will eventually include elementary and college levels. Three approaches using the fundamental concepts and modern trends are being used experimentally. The Visiting Biologist Program for High Schools is supported by the National Science Foundation and administered by AIBS. Prominent biologists visit schools from one to three days. The Secondary Biological Sciences Film Series is directed primarily at the 10th grade level and will consist of 120 lecture-demonstration 30-min. films each correlated with teachers' manuals and study guides. Films are to be available singly, in combination, or as a set. Selected winners of the National Science Fair-International are guests and display their exhibits at the AIBS Annual Meeting. Write: Educational Activities, The American Institute of Biological Sciences, 2000 P St., N.W., Washington, D. C.

American Medical Association

County and state medical societies cooperate with local science fairs by joining in sponsoring committees, giving special awards and scholarships, arranging counseling, etc. The AMA presents citations at the annual National Science Fair-International and selected winners are guests at the AMA annual meeting. A 25-min., color, sound motion picture—I Am a Doctor; a large-scale exhibit on Medicine as a Career; descriptive literature on the study of medicine and school guidance program suggestions are available from the AMA via local medical societies. For information write to Leo E. Brown, American Medical Association, 535 N. Dearborn St., Chicago 10, Ill.

American Pharmaceutical Association

Through the efforts of the National Advisory Commission on Careers in Pharmacy, which is comprised of representatives of every national organization in the profession, practicing pharmacists are being urged to assist students and their science teachers in the development of science projects. The Commission is coordinated by the APhA, which presents two awards at the National Science Fair-International. A career brochure, *See Your Future in Pharmacy,* two color sound films (one for junior high school age and one for senior high and adults), about the profession of pharmacy are available and a 20-foot Career Exhibit may be rented from the APhA. Address: George B. Griffenhagen, American Pharmaceutical Association, 2215 Constitution Ave., N.W., Washington 7, D. C.

American Society for Microbiology

Many Local Branches of the ASM have committees which provide speakers on microbiological topics and give aid to biology students and teachers. ASM Committee on Education issues certificates of commendation to students, and their teacher sponsors, who win awards for exhibits in microbiology at district, regional and state science fairs, and certain Local Branches give additional awards of $25 for first place winners. ASM sponsors awards at the National Science Fair-International. Suggestions for experiments, projects, lists of films, references and other teaching aid material have been published by the Committee as a special issue (June 1960) of *The American Biology Teacher.* Teachers may obtain this publication from the Executive Secretary, ASM. Information relating to the above and a copy of a career brochure may be obtained free. A list of universities offering degree programs in bacteriology and/or microbiology is available at 50c. Address: Raymond W. Sarber, Executive Secretary, American Society for Microbiology, 19875 Mack Ave., Detroit 36, Mich. A 15-minute color movie, "A Career in Bacteriology," may be rented or purchased from Audio-Visual Center, Indiana University, Bloomington, Ind., and other sources.

American Veterinary Medical Association

Veterinary associations are being encouraged to assist students toward the development of proper scientific attitudes and techniques. Aid to science fair personnel through these associations and their Women's Auxiliaries is being developed. A booklet, *Veterinary Medicine as a Career,* single copies free, additional copies 10c each. Sponsors may obtain a list of veterinary medical organizations to contact for direct assistance. AVMA presents awards at the National Science Fair-International; top winner is guest at the AVMA annual meeting. Address: Heinz R. Kuehn, Director Public Information, 600 S. Michigan Ave., Chicago 5, Ill.

B'nai B'rith Women

B'nai B'rith Women participates with and contributes to three major youth services: B'nai B'rith Youth Organizations, Hillel Foundations and Vocational Service. Direction of young people is carried on by trained personnel. Supervised leisure activities enable youth to explore and express interests and learn skills, while developing healthy patterns of human relationships and fulfillment of responsibilities. Clinics are conducted to provide guidance in the selection of careers. Write: B'nai B'rith Women, 1640 Rhode Island Ave., Washington 6, D. C.

Chamber of Commerce of the United States

Over 2000 Chambers of Commerce have Committees on Education which have been alerted to manpower problems and to the need for career planning. Many chambers cooperate with school officials in planning and conducting: "Business-Education Days" in which teachers and counselors visit local businesses to learn future career needs; "Education-Business Days" when businessmen visit schools to learn how the teacher can be aided; "Career Conferences for Teen-Agers" in which students have the opportunity to learn the trends in local manpower needs and the types of training required. Business and professional men in every community are ready to work with teachers and administrators to improve guidance programs, to develop science fairs or to secure materials, equipment or work experience to make science teaching more effective. For further information consult your local Chamber of Commerce or write to the U. S. Chamber of Commerce at 1615 H St., N.W., Washington 6, D. C.

Thomas Alva Edison Foundation

The Edison Foundation directs programs to encourage boys and girls to undertake careers in science and engineering. The Foundation conducts a public information program for improving the quality and quantity of science education. Science Youth Day, held annually on Thomas Alva Edison's birthday, February 11, is a nation-wide program to interest young people in science and engineering. Participating in this International Edison Birthday Celebration are major companies of American industry, governmental agencies, professional, scientific and educational societies, and other groups in the United States and abroad. Science experiment booklets and other free materials are distributed to students. Student visits to industrial plants and research and development laboratories are arranged. The Foundation organizes national conferences and Edison Institutes on scientific manpower and science education. Awards are given in the mass media to encourage better program material in sciences. A list of publications is available by writing to Thomas Alva Edison Foundation, Inc., 8 W. 40th St., New York 18, N. Y.

Engineering and Science Organizations

Each field of engineering has its own professional society and some of these, including the so-called founder societies, are represented by the Engineers Joint Council, 29 W. 39th St., New York, N. Y. Problems of education, personnel, training and utilization are the concern of the Engineering Manpower Commission at the same address, while Scientific Manpower Commission, 1507 M St., N.W., Washington 5, D. C., performs the same function for scientific organizations. Teachers and others may make

inquires on special problems in connection with science, technology and careers. The Scientific Manpower Commission may be consulted on Selective Service and other military problems.

Junior Engineering Technical Society

Program designed to stimulate and encourage interest in engineering, applied science and mathematics among high school students. JETS chapters are sponsored in high schools by local industry and/or professional groups throughout the United States and two foreign countries. JETS provides free materials for initiating and operating the chapters. The program includes a National Project Exposition with awards and scholarships. JETS offers the students an opportunity to explore the various technical fields and to compare attitudes, interests and abilities with the requirements of technical professions through actual experiences and contacts. Write JETS, P. O. Box 589, East Lansing, Mich.

Manufacturing Chemists' Association, Inc.

MCA, representing the chemical manufacturing industry, executes an aid-to-education program that embraces all levels from kindergarten to college. For information, request free copy: *An Industry Helps Our Schools*. Holt, Rinehart and Winston, 383 Madison Ave., New York 17, N. Y., is now sole distributor of *Scientific Experiments in Chemistry* (for senior highs), *Superstition to Supersonics* (for junior highs), and *Matter, Energy and Change* (for elementary school supervisors and teachers). For information on MCA's chemistry films ("Combustion"; "Chlorine—A Representative Halogen"; "Oxidation-Reduction" and "Chemistry of Water") write Southerland Educational Films, Inc., 201 N. Occidental Blvd., Los Angeles 26, Calif. Free publications: *Guide to Aid-to-Education Materials Available from the Chemical Industry; Frontiersmen of the Future*, a careers handbook; *Source of Information on Careers in the Scientific Fields; Film Guide on Chemicals, Chemistry and the Chemical Industry. Chemical Industry Facts Book*, single copies with *Teacher's Guide*, 45c to educators. Address: Manufacturing Chemists' Association, 1825 Connecticut Ave., N.W., Washington 9, D. C.

National Academy of Sciences-National Research Council

Through its Advisory Board on Education the NAS-NRC works with scientists and scholarly organizations for improvement of science education at all levels. Principal attention is given to programs designed to improve the preparation of teachers, at graduate and undergraduate levels, and to expansion of opportunities for continual professional development. Action is being taken to promote better planning for production and use of films and television in science education. In cooperation with local and national industries and associations, community action is promoted to develop better local understanding and support of schools. Address: Advisory Board on Education, National Academy of Sciences-National Research Council, 2101 Constitution Ave., N.W., Washington 25, D. C.

National Association of Manufacturers of the U. S. of America

By encouraging study of science and mathematics in schools, cooperation with local and regional science fairs and the National Science Fair-International, the NAM Education Department and Committee on Research is promoting development of science talent. Booklets, *Your Opportunities in Industry as a Technician* and *Industrial Research and Development*, have been distributed in large numbers. Copies free on request as long as current supply lasts. Address: Education Dept., National Association of Manufacturers, 2 E. 48th St., New York N. Y.

National Aviation Education Council

To help secondary school teachers stimulate interest in science or mathematics as they relate to aviation and space exploration, NAEC publishes a *Teaching Guide for the Earth and Space Science Course* ($1), *Science Teaching Aids for a Stronger America* (75c) and *Mathematics Teaching Aids for a Stronger America* (75c) offer suggestions for using aviation facts and principles in the classroom. *Guidance Aids for a Stronger America* (75c) is a handbook for guidance counselors. *The Arithmetic of Flying* (50c) includes more than 250 arithmetic problems like those pilots of light aircraft solve in order to fly safely. *1961 U. S. Aircraft, Missiles, and Spacecraft* ($1.50) describes products of U. S. aerospace industry. *The Space Frontier* (50c), newly revised and updated, includes a log of all U. S. and Soviet satellite and space probes and a greatly enlarged glossary of astronautics terms. A special *Science-Mathematics Packet* ($11.39) includes 15 books useful in science and mathematics classrooms, a bonus of three booklets and a 4-color Astronautic Systems chart (22" x 46"). To provide aviation and space information to schools, libraries and individuals, NAEC offers a mailing service ($5 a year). Aids as units on rockets and space travel, bibliographies, *Skylights* (an aerospace fact sheet) and *Pictures, Pamphlets and Packets* (a source book of free and inexpensive aids) available to teachers and librarians requesting them on school or library stationery. Address: National Aviation Education Council, 1025 Connecticut Ave., N.W., Washington 6, D. C.

National Committee for Careers in Medical Technology

This Committee is expanding its awards program for projects related to clinical laboratory medicine. In cooperation with the Intersociety Committee on Pathology Information, NCCMT supplies certificates for local and state medical technologist and pathologist societies to award at science fairs in their localities. Summer jobs in hospital pathology laboratories often accompany the local awards. A summer job with the American Registry of Pathology at the Armed Forces Institute of Pathology in Washington, D. C., plus $300 for travel expenses was First Prize for a pathology-medical technology project at the National Science Fair-International. Second prize was a $100 Bond. The committee distributes career guidance information, including pamphlets and films describing the profession of medical technology, and data on aptitudes, training, qualifications and salaries. NCCMT is sponsored by the American Society of Clinical Pathologists, the American Society of Medical Technologists and the College of American Pathologists. Address: National Committee for Careers in Medical Technology, 1785 Massachusetts Ave., N.W., Washington 6, D. C.

National Merit Scholarships

National Merit Scholarships are four-year college scholarships available to high school seniors. The stipend accompanying each scholarship is based on need and may vary from $100 to $1,500 a year. Winners choose their colleges and curricula during the competition. A supplemental grant to the college usually accompanies the scholarship award. Last year 960 Merit Scholarships were awarded, including some 563 Merit Scholarships offered by and named for 139 business organizations. Registration for the Merit Scholarship Program is by high school. Each principal is sent registration materials in September. The following Spring, the National Merit Scholarship Qualifying Test, the first step in the competition, is administered to second-semester juniors and first-semester seniors. Participating students pay a $1 testing fee to the testing agency. The 1961-62 competitions began with the Qualifying Test in March 1961. Winners will be announced in the Spring of 1962. The test for the 1962-63 competition will be given either Tuesday, March 6, or Saturday, March 10, 1962, to students who will enter college in 1963. Since the inception of the Merit Program in 1955, nearly $25 million in Merit Scholarships have been awarded to 4,897 students. For information see your principal or write: National Merit Scholarship Corporation, 1580 Sherman Ave., Evanston, Ill.

National Pest Control Association

The NPCA is expanding its program of aid to science fairs and other local programs designed to encourage science study. Through individual members and cooperating state associations, NPCA seeks to make information available on general biology, entomology and economic entomology. NPCA distributes *Careers in Entomology*, in cooperation with the Entomological Society of America, and *Career Opportunities in the Pest Control Industry*. Write: National Pest Control Association, 250 West Jersey Street, Elizabeth, N. J.

National Science Foundation

This Federal Government agency conducts programs of support and stimulation to science and research, including scientific personnel and education. Most of its operations are through grants that facilitate activities by other organizations. Programs in science education include support of institutes, research participation and summer fellowships, and other training programs for high school and college teachers of science and mathematics; research participation and independent study for college undergraduates; limited summer programs for high school students of science and mathematics; traveling science libraries; fellowships for graduate students and advanced scholars in science, mathematics and engineering; and projects for the improvement of course-content materials and the development of new teaching and learning aids in science and mathematics. For information write for *National Science Foundation Programs for Education in the Sciences*, National Science Foundation, Washington 25, D. C.

National Science Teachers Association

NSTA, a department of NEA and affiliate of AAAS. Annual membership ($6) provides: 8 issues of *The Science Teacher* and NSTA Packet Service. Publications available are: *Planning for Excellence in High School Science* ($1), *Quality Science for Secondary Schools* ($3), *New Development in High School Science Teaching* ($1.50) and *Careers in Science Teaching* (one copy free). Activities include annual convention, nine regional meetings and maintaining a national registry of science and mathematics teachers. NSTA sponsors Future Scientists of America, a junior and senior high school club-type activity. Services and materials include: *FSA Sponsor's Guidebook*, Charter Plaque, *FSA Centrifuge* newsletter and other free and low cost student publications. Membership cost is based on school enrollment. The FSA program of Awards, now in its 11th year and open to students in public, private and parochial schools for research-type projects or investigations, offers $250 scholarships to 25 (11-12 graders), 660 medallion awards (7-12 graders), 2000 honorable mention certificates and certificates to schools of award winners. *Vistas of Science*, books on topics such as spacecraft, measurement and cell physiology, will be available in November. (A copy of each free to FSA chapters.) Write: National Science Teachers Association, 1201 16th St., N.W., Washington 6, D. C.

National Youth Conference on the Atom

Approximately sixty investor-owned electric utility companies are sponsoring attendance of outstanding high school science students and teachers to the 1961 National Youth Conference on the Atom, November 9-11, The Palmer House, Chicago. "The purpose of the conference is to present to a group of the Nation's most able high school science students and teachers

an authoritative and inspiring picture of the peaceful atom in its various applications, and to help advance interest in the study of science in the United States." Selection of student and teacher delegates is carried out locally by education authorities working with the electric companies. For information query your local electric company or write: T. R. Jordan, Electric Companies Public Information Program, Bozell & Jacobs. Inc., 230 Park Ave., New York 17, N. Y.

New England Council

The New England Council has established a Program of Industry Aids to Education, designed to provide a means through which industry, professional societies and schools may work together. The Program is developing this link first in the sciences and math at the secondary and elementary school level on the basis that industry has, through knowledge, experience and resources, the tools to help meet many of the schools' needs. The Program plans to have available listings of industry's resources throughout New England, and source material valuable to teachers. Write: Robert M. Burnett, Industry Aids to Education, New England Council, Statler Building, Boston 16, Mass.

Oak Ridge Institute of Nuclear Studies

ORINS is a non-profit educational corporation of southern universities, operated under contract to the U. S. Atomic Energy Commission. Its programs are designed to further the cause of science and science education from the precollege through the postdoctoral levels. Its activities include a program to train secondary school science teachers to become either "traveling teachers" or specialists in their own systems; the administration of graduate fellowship programs, traveling atomic energy exhibits, student tours of nuclear facilities, and a college student training program; the presentation of courses in the use of radioisotopes, special courses for high school and college teachers, and symposia and conferences; the maintenance of a medical research hospital, a museum of atomic energy, and a technical library; and the provision of lecturers for universities, research opportunities for university scientists, and a mobile radioisotopes laboratory for on-campus college training. No program of the Institute is limited to participation by member universities. Address: Oak Ridge Institute of Nuclear Studies, P. O. Box 117, Oak Ridge, Tenn.

Optical Society of America

OSA has an active career-incentive program. A booklet, *Careers in Optics*, is being prepared. OSA has eight sections: Rochester, N. Y.; Boston, Mass.; Detroit, Mich.; Chicago, Ill.; Niagara Frontier; South Western Connecticut; Northern and Southern California, which welcomes young scientists to their meetings (write to your local section and ask for a program). OSA Student Memberships are available at $2 a year. These give students the right to attend OSA meetings and receive OSA publications. OSA again expects to present two awards at the National Science Fair-International of $100 and $75, for books and materials to enable the student to continue his studies in optics. Citations and book awards may be offered to regional fairs. For information about careers in optics, summer employment opportunities, speakers and information about OSA local sections, write: Executive Office, Optical Society of America, 1155 16th St., Washington 6, D. C.

Science Service

Science Service is the non-profit institution for the popularization of science, with trustees nominated by the NAS, NRC, AAAS, E. W. Scripps Estate and the journalistic profession. It operates as a news service to newspapers and magazines, publishes magazines, issues experimental kits, conducts Science Clubs of America, Science Talent Search and National Science Fair-International. Adult sponsors are invited to affiliate classes, groups or clubs and receive free the *SCA Sponsor Handbook* and other aids. The Science Talent Search, conducted by Science Clubs of America and sponsored by the Westinghouse Educational Foundation, is open to high school seniors. The 21st Science Talent Search begins in December 1961. Teachers should ask for examinations about Oct. 15. Completed entries must arrive at Science Service not later than midnight, Dec. 27. *How You Can Search for Science Talent* sent free on request. Young scientists in schools show projects in thousands of science fairs. The best of these compete in regional fairs, which will send their two top sophomore, junior or senior finalists to the 13th National Science Fair-International in Seattle, Wash., May 2-5, 1962. For information, write Science Service. Free material available on various activities and samples of publications sent on request. *Science News Letter*, weekly summary of current science, $5.50 a year, trial $3.13 for 41 weeks; *Chemistry*, eight issues, $4 a year; *Things of Science*, monthly experimental kits, membership $5 a year, Science Service Books, each $2 postpaid: *Science Exhibits, Scientific Instruments You Can Make, Organic Chemistry for the Home Lab, Experimenting with Chemistry. The Chemical Elements* and *Science Projects Handbook*, 55c each postpaid, 10 for $5. *Wonderful World of Science*, 50c (plus 5c postage), 10 for $5, postpaid. *Thousands of Science Projects* listing titles of exhibits, 25c a copy, 10 for $1. Color Slide Sets: National Science Fair (7 sets), Elementary and Junior High School Science Projects (1 set), The Science Talent Search (1 set). Each set, 30 slides, $6. Science Service, 1719 N St., N.W., Washington 6, D. C.

Scientific Apparatus Makers Association

SAMA represents some of the nation's principal manufacturers and dealers in the scientific laboratory and equipment industry. It is concerned that educators and students have at their disposal the finest and most-up-to-date tools of their profession. Through yearly awards, cooperation with Federal educational agencies and direct liaison with leading professional societies, the SAMA supplements its member companies' efforts to better prepare our nation's scientists and engineers. Leaflets and reprints of published articles available without charge: *A Guide to Evaluating Your Science Facilities, Your Career with the Instrument and Control Industry by the Recorder-Controller Section, How to Help Your Town's Editor, I Am the Science Teacher, SAMA Motion Picture Film Directory, Chart-Suggested Built-In Instruments and Equipment For Laboratory Furniture—Including Certain Specific Finish Requirements.* Write: Dir. Public Information, Scientific Apparatus Makers Association, 20 N. Wacker Dr., Chicago 6, Ill.

The National Foundation

The Health Scholarship program of the National Foundation helps deserving students interested in careers in nursing, occupational therapy, physical therapy, medical social work and medicine and thereby helps to alleviate shortages of personnel in these fields. Approximately 500 Health Scholarships, four-year awards, are offered each year to high school seniors and college undergraduates. They pay $500 a year, renewable annually, for a total of $2,000. They are apportioned geographically according to population in each of the 50 states, District of Columbia, Puerto Rico, Virgin Islands and Canal Zone. The sole obligation of each recipient is to have the serious intention of completing his education in the profession of his choice and of serving as a member of that profession. Write: The National Foundation Health Scholarships, 800 Second Ave., New York 17, N. Y.

U. S. Forest Service

Through its Conservation Education Branch the Forest Service, U. S. Department of Agriculture, assists teachers in the development of conservation materials in the curriculum. Forest Service provides teaching materials, charts and posters. Its personnel serve as resource specialists in school programs. Several publications serve to inspire and inform youth of career opportunities. Special ideas have been outlined for science fair projects. Write: Conservation Education Branch, Forest Service, U. S. Department of Agriculture, Washington 25, D. C.

U. S. Geological Survey

The U. S. Geological Survey has prepared *Project Ideas in the Earth Science*, a pamphlet describing 20 projects, for free distribution to teachers and students. Write to nearest U. S. Geological Survey Office: 503 Cordova Bldg., Anchorage, Alaska; 232 Appraisers Bldg., San Francisco, Calif.; 1031 Bartlett Bldg., Los Angeles, Calif.; 468 New Customhouse, Denver, Colo.; 602 Thomas Bldg., Dallas, Tex.; 504 Federal Bldg., Salt Lake City, Utah; South 157 Howard St., Spokane, Wash.; or to the Director, Washington 25, D. C.

U. S. Soil Conservation Service

The Soil Conservation Service, an agency of the U. S. Department of Agriculture, furnishes technical assistance to establish soil and water conservation programs and provides informational materials to teachers and others. Career leaflets: *Students—Start Your Career in SCS Before You Graduate*—Misc. Pub. #714, *An Engineering Career For You In SCS*—Misc. Pub. #715, *A Soil Science Career For You in SCS*—Misc. Pub. #716, *Careers in SCS*—Misc. Pub. #717 are available. *Teaching Soil and Water Conservation—A Classroom and Field Guide* PA #341 and other materials are available to teachers, librarians and leaders. Contact state and local Soil Conservation Service Offices.

U.S. Department of Defense

The Department of Defense, including the Military Departments, cooperates with individuals and groups in providing guidance and assistance on projects which are designed to stimulate interest in scientific pursuits. This includes speakers' programs, films, furnishing of instructional and informational materials, demonstrations, exhibits and displays of military products, installation tours and briefings, and assistance in certain forms of scientific experimentation. Address: Commanding Officers of local military installations.

U. S. Air Force

The U. S. Air Force again will provide trip awards to its research laboratories for National Science Fair-International finalists in nine Air Force-orientated areas. The Aerospace Education Foundation also will recognize these nine finalists. The Air Force will continue recognition at the regional fairs in fields of Aerospace Sciences. For details, write: Science Service.

U. S. Army

The U. S. Army will award trips to its research and development facilities to 16 National Science Fair-International finalists for exhibits in eight specialized fields. Affiliated fairs will be supported by area commanders.

U. S. Navy

The U. S. Navy requests each fair affiliated with the National Science Fair-International to select one male high school sophomore, junior or senior for the best Navy-oriented project. District Commandants have been requested to contact Fair Directors and offer helpful assistance. One boy from each fair is invited for a week as a Navy Science Cruiser. The U. S. Navy will honor 10 at the 13th NSF-I.

ENTOMOLOGY

The Way of the Honeybee

The honeybee lives a short, active life, but she spends an amazing amount of time loafing. Cooperation is complete within the hive, Gloria Ball reports.

See Front Cover

➤ THE WORKER HONEYBEE begins her life as a janitor and ends it as a dancer. In between, she is all things—nurse, builder, honeymaker, guard and scout.

Throughout the short nine weeks of her lifetime, she works without being told what to do, for within the strange, communal society of the honeybee, there are no overlords, or orders, no coercion and no major decisions without unanimous consent.

There is, however, an irresistible force within the community. It is subtle; no bee can escape it. And it is believed to be the factor that makes every honeybee a selfless toiler for the common good.

The force is a group of chemicals, known as pheromones, secreted by the queen bee. In some way, these chemicals, which are passed from one bee to another by mouth, dictate the behavior and physiological responses of every bee in the community.

Essentially, the workers are drugged into behaving in a prescribed manner.

Thus endowed with a single purpose, the worker graduates from one type of work to another as her body matures. Immediately after she is born she begins cleaning up after her roommates who may number tens of thousands. At the age of three days the nurse glands in the head are nearing maturity and she assumes care of the larvae. About the tenth day the wax glands in the abdomen begin to secrete thin scales of wax and she builds the familiar six-sided cells of the comb.

Worker Graduates

The seventeen-day-old worker is engaged in storing pollen and concentrating nectar. At 20 days the bee stands guard at the hive entrance.

Beginning at three weeks of age and continuing to death, the worker is a forager, responsible for finding and delivering food and water.

Although workers may be concerned primarily with one type of work at any given age, they often perform several different tasks in the course of a 10- or 12-hour working day, particularly while they are still young and working in the hive. A worker whose main duty is nursing, for example, may spend a part of her day cleaning and capping brood cells, and building comb.

Since there are no bosses in beedom, each worker is her own informant and actually spends about 30% of her working time running about the hive, looking for something that needs to be done. When she finds it, she does it, and then looks for something else to do.

Strangely enough, bees spend a good deal of time loafing—some as much as 40% of the working day. This is necessary to a certain extent, for it means that there is always a supply of rested bees to meet any emergency.

Among the most fascinating aspects of honeybee society are the various methods of communication.

More than 20 years ago, Prof. Karl von Frisch of the University of Munich discovered that forager bees, one of which is seen on the cover of this week's SCIENCE NEWS LETTER, inform others of a newly found food source by dancing on the vertical surface of the comb. The pattern of the step tells the direction and distance of the find, and the scent on the dancer identifies the type of flower visited most recently.

Two Major Dances

There are two major dances; the round dance for sources near the hive and the tail-wagging dance for others farther away.

The rule among foragers is that a source with much to offer deserves a lengthy and vivacious dance. A collector delivering nectar of poor quality does not advertise her source and in the presence of a vigorous dancer, she will forsake her own field and fly off to the better source.

More recently, Dr. Martin Lindauer, formerly a student and now a colleague of Prof. von Frisch, reported that occasionally the forager who brings in a poor or watered-down load of nectar is sought eagerly by the hive workers. They assume a begging attitude and shun the bee bearing rich nectar.

Hive Workers Need Water

This switch in preference means only one thing; the hive is getting too hot and the hive workers need water. Already the nurses who first noticed the heat have regurgitated the water in their stomachs and have spread it in a thin film over the heated area. As the water evaporates it carries excess heat away. But the nurses need more water to spread out and to dilute the concentrated honey in their own stomachs, for they cannot feed this rich mixture to the larvae, but must dilute it to about 60% water. Most important of all, however, is the brood nest, which is kept between 94 and 96 degrees Fahrenheit regardless of the outside temperature.

Only the foragers can collect water, for they alone know the terrain and where to find water, which is gathered and delivered a drop at a time. If the need is great, a fact which the foragers judge by the speed with which the water spreaders relieve them of their load, the foragers do a different dance to alert others to the needs of the hive.

When water needs have been met, the nurses begin to ignore the collectors and these bees themselves must enter the hive, looking for someone to relieve them of their load. While water deliveries must be started quickly, they must be stopped just as quickly, for there is no place to store water in the hive.

A unique experience of a bee colony is swarming. It occurs only once in the lifetime of a normal bee if she is lucky enough to be included in the grand move.

In May or June the spring baby boom begins, and food from abundant flowers rapidly fills up storage space in the hive. Thus swarming is the solution to general overcrowding.

Some 15 to 25 days before the old queen and half the bees actually leave the hive, certain changes occur within. The bees begin to warble.

This means that there is a change in the sounds coming from the hive. Normal bee sounds range from 100 to 600 cycles per second, well within the range of human hearing. But when the hive sounds become limited to a range of 225 to 285 cycles per second and drop 10 decibels from normal daytime intensity, swarming is imminent. Such changes can be detected by electronic means and can be used to predict future swarming.

Bees Look for New Home

During this pre-swarming time, foragers become less interested in food and the older ones begin to poke around in cracks and mouse holes that might make a suitable new home.

When they first leave the hive, the swarming queen and her followers settle temporarily on a limb out in the open. Immediately the scouts begin house hunting in earnest and return to dance out their information.

In house hunting, bees may dance for hours, telling their companions not only of the distance and location of the prospective home, but also of its qualities.

While the swarm hangs on the limb for a few days or as long as two weeks, scouts may bring back reports on 20 different possibilities. Groups in favor of one site try to outdance other factions and a virtual danceathon results.

Eventually, after inspecting a promising site for several days and appraising it under different conditions of wind and weather, bees favoring a particular place may decide that it is not suitable after all. These then shift preference to another site and when everyone agrees, the swarm moves off the limb, into the new home.

Invariably, Dr. Lindauer states, the bees make the right choice.

INVENTION

Patents of the Week

The process and equipment for producing living animal tissue under controlled conditions and on a "mass production" basis have been patented.

▶ THE GROWING of living animal tissue under controlled laboratory conditions is fairly common, but an invention just patented may be the first attempt to put it on a "mass production" basis.

Harry A. Toulmin Jr., Dayton, Ohio, awarded patent No. 2,996,429 for the process and the equipment, said his method will "grow large quantities of tissue in short periods of time." He assigned rights to National Toxicological Laboratories, Inc., Dayton.

He points out that tissue is needed in large amounts for cancer research, vaccine production and other medical efforts.

Drug companies now producing polio-virus vaccine, for example, grow each batch of virus on kidney cells taken directly from the monkey. This technique requires a large number of expensive monkeys. A mass production tissue culture method, however, essentially would give laboratories a big, growing, monkey kidney in a huge test tube. Individual laboratories now usually produce only enough to supply their own basic research requirements.

The Toulmin technique involves a rectangular culture chamber holding a cylinder-shaped drum to which a semiporous cellophane membrane is fastened. The culture removed from an animal body for controlled growth will adhere to this membrane.

The drum is revolved slowly (about 12 revolutions per hour) through a nutrient bath of animal serum and embryo extract, which gradually soaks through the culture and the membrane. A gaseous mixture of oxygen, nitrogen and carbon dioxide, necessary for atmospheric conditioning and tissue respiration, is added to the chamber through a filtered pipe. Additional control is provided by interior lighting.

Used nutrient and gases can be pumped from the chamber and fresh supplies introduced in a continuous process until the desired growth level is reached. The new tissues can then be removed through transparent panels that also permit close observation of the growth process.

An improved method for making carbon monoxide gas "simply, inexpensively and continuously" won patent No. 2,996,359 for Allen L. Mossman, Cedar Grove, N. J. Rights were assigned to the Matheson Company, Inc., East Rutherford, N. J.

The basic reaction on which the process is based, dehydration of formic acid with sulfuric acid, is old. Mr. Mossman, however, has added modifications that reportedly make it commercially feasible. Its previous use has been confined largely to carbon monoxide production "in laboratory quantities."

Finding that mixing cold components causes waste and delay, the inventor preheated the sulfuric acid to about 212 degrees Fahrenheit before pumping the two liquids into the reactor. He also shortened dehydration time to ten seconds or less by increasing reaction temperature to about 248 degrees Fahrenheit from the 158 to 176 degrees Fahrenheit recommended in standard chemistry textbooks. Ceramic packing in the reaction zone retains the high temperature and furthers the mixing.

Inventor James Sidles, Cuyahoga Falls, Ohio, was given patent No. 2,995,927 for a device measuring vibrations in a moving automobile. He described it as "especially useful" in running comparative tests on "the slap, thump and vibration" caused by different sets of tires. Rights were assigned to the Firestone Tire & Rubber Company, Akron, Ohio.

The device consists of a wooden base holding a screened sieve with a trap directly below it. The sieve is filled with tiny pellets.

As the car moves, with the device mounted on the floor, wheel vibrations are picked up in the base and side supports, causing the pellets to drop through the screen into the trap. The number of pellets present at the end of the ride is used as a basis for measuring vibration effects.

A plastic arm, complete with "veins" made from gum rubber tubing, received patent No. 2,995,832, awarded to Samuel W. Alderson, New York. Designed as an aid to teaching vein-puncture techniques, it is built to allow insertion of a new "vein" when one of the originals "has served its usefulness through repeated puncturing" with a hypodermic syringe. Rights were assigned to Alderson Research Laboratories, Inc., Long Island City, N. Y.

Adding a water-soluble salt of carboxymethyl cellulose to a single-stage cake mix containing emulsified shortening cuts the time necessary for beating the mix, inventor Charles C. Elsesser, Katonah, N. Y., has found. His mix received patent No. 2,996,384, assigned to General Foods Corporation, White Plains, N. Y.

• Science News Letter, 80:157 September 2, 1961

The *teeth* of children contain growth rings which reflect the developmental history of the child, just as the growth rings of a tree reflect the seasons, climate and the quality of the nutrients in the soil.

Glaucoma is responsible for one out of every eight cases of blindness and is more frequent with increased age.

Among industrial workers, *suicide* ranks third behind cardiovascular diseases and accidents as a cause of death.

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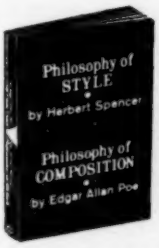

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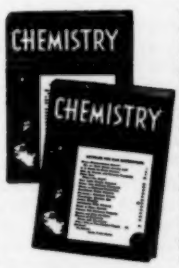

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AIRPORT TRANSPORTATION: A Study of Transportation Means Between Airports and the Metropolitan Areas They Serve—Peter G. Nordlie, Dir.—*Human Sciences Research (OTS)*, 400 p., maps, paper, $5. Study prepared for FAA, includes a survey of local origins and destinations of users of Washington National Airport.

ANALYTICAL ELEMENTS OF MECHANICS, Vol. 2: Dynamics—Thomas R. Kane—*Academic*, 337 p., diagrams, $6.25. Undergraduate or beginning graduate course in classical mechanics, using vector analysis.

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ASTHMA, HAY FEVER AND OTHER ALLERGIES—*Allergy Foundation of America*, 14 p., illus., paper, free upon request direct to P. O. Box 1005, New York 17, N. Y. Discusses causes, symptoms and relief.

BALLISTIC MISSILE AND SPACE VEHICLE SYSTEMS—Howard S. Seifert and Kenneth Brown—*Wiley*, 526 p., illus., $12. Course emphasizing the relationships among the various parts of a missile or space system, with stress on engineering design aspects of vehicle mechanical systems.

BASIC LAWS OF MATTER—H. W. S. Massey and Arthur R. Quinton—*Herald Bks*, 178 p., diagrams by Vee Guthrie, $3.75. Fundamental concepts of matter in briefest outline, clearly illustrated, for student, teacher, and layman.

BOSS KET: A Life of Charles F. Kettering—Rosamond McPherson Young—*Longmans*, 210 p., $3.50. Biography for young people of the famous inventor of the automobile self-starter.

CANADIAN CANCER CONFERENCE: Proceedings of the Fourth Conference, 1960—R. W. Begg and others, Eds.—*Academic*, 435 p., illus., $12. Papers on perspectives in biochemistry in cancer research, on cell behavior, viral carcinogenesis and chemotherapy.

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THE COMPLETE BOOK OF BIRTH CONTROL—Alan F. Guttmacher, M.D., with Winfield Best and Frederick S. Jaffe, foreword by Rev. William H. Genne—*Ballantine Bks*, 152 p., diagrams, paper, 50¢. Authoritative and reliable guide to methods of family planning, lists Planned Parenthood Centers in U.S., reputable birth control products and family planning agencies around the world.

THE CRY FOR HELP—Norman L. Farberow and Edwin S. Shneidman, foreword by Robert H. Felix, M.D.—*McGraw*, 398 p., illus., $9.95. Report on results of clinical and research findings, case histories and techniques for evaluating and treating suicidal persons, bibliography covering the years 1897-1957.

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SYMBOLS, SIGNALS AND NOISE: The Nature and Process of Communication—J. R. Pierce—*Harper*, 305 p., illus., $6.50. Communications expert writes about Shannon's information theory, mathematical models, encoding and cybernetics, with appendix explaining mathematical notation for the general reader.

TRANSIENT CIRCUIT ANALYSIS—Y. H. Ku—*Van Nostrand*, 441 p., $13. Graduate course, covering the subject from the combined Fourier-transform and Laplace-transform approach.

TRANSLOCATION OF PLANTS—A. S. Crafts—*Holt*, 182 p., illus., $5. On the beginning graduate level, summarizes research findings on movement of water, salts, viruses and tracers, uptake of water and salts by roots, solute movement of phloem and movement of assimilates.

THE TRUE BOOK OF MAGNETS AND ELECTRICITY—Illa Podendorf—*Childrens Press*, 47 p., illus. by Robert Borja, $2. Experiments for the youngest readers.

THE TRUE BOOK OF WEATHER EXPERIMENTS—Illa Podendorf—*Children's Press*, 47 p., illus. by Felix Palm, $2; paper, $1. Primary reading level.

VERTEBRATE SPECIATION: A University of Texas Symposium—W. Frank Blair, Ed.—*Univ. of Texas Press*, 642 p., illus., $8.50. Papers discussing isolating mechanisms, evolution of behavior, polymorphism, population dynamics, and age and origin of species.

WHAT MAKES DAY AND NIGHT—Franklyn M. Branley—*Crowell*, unpaged, illus. by Helen Borten, $2.35. Colorful picture book with simple explanations of how we know that the earth is turning.

WHERE THE BROOK BEGINS—Margaret Farrington Bartlett—*Crowell*, unpaged, illus. by Aldren A. Watson, $2.35. For the youngest readers.

WRITING BETTER TITLES AND ABSTRACTS—John D. Stevens—*Washington State Univ., Technical Extension Service*, 11 p., paper, free upon request direct to publisher, Pullman, Wash. Focuses technical writer's attention on the importance of keeping titles and abstracts short and specific, since they are the only part most readers ever read.

YOUR FUTURE IN CHEMICAL ENGINEERING—Raymond L. Feder—*Rosen, R.*, 158 p., $2.95. Study for those interested in selecting a career in this particular field.

YOUR FUTURE IN NUCLEAR ENERGY FIELDS—William E. Thompson, Jr.—*Rosen, R.*, 160 p., $2.95. Reviews career possibilities in the profession of nuclear physics and engineering.

YOUTH PHYSICAL FITNESS: Suggested Elements of a School-Centered Program, Parts I and II—President's Council on Youth Fitness—*GPO*, 111 p., illus., paper, 40¢. See story, SNL August 12, 1961, p. 105.

• Science News Letter, 80:158 September 2, 1961

Questions

METEOROLOGY—What is the purpose of a meteorological workshop to be held Nov. 13-22? p. 146.

GEOPHYSICS—How far below sea level is a deep passage found in the Antarctic? p. 147.

Photographs: Cover, U. S. Department of Agriculture; p. 146, Bendix Corporation; p. 147, Boeing Company; p. 149, Massachusetts Institute of Technology; p. 151, Westinghouse Electric Corporation; p. 160, Mail Signal Co.

PHYSICS

Optical Masers Probe The Secrets of Matter

➤ A NEW "tuning fork" for exploring the inner structure of matter is reported by a British scientist.

Two optical masers giving off light rays that sometimes clash can produce infrared or "invisible light" rays that penetrate matter. The amount of rays absorbed by substances at varying frequencies tell scientists about their structure.

The frequency of the penetrating rays is varied by heating one of the masers, Dr. D. C. Laine of the University College of North Staffordshire reports in Nature, 191: 795, 1961. The frequency can then be "tuned" within the entire range of the infrared spectrum.

One optical maser would continuously give off rays of similar wavelength. Wavelengths varied by the heated maser would merge with the similar wavelengths, producing distinct "beat" signals, which are used to probe matter.

This possible research tool "presents a very attractive approach to the long-standing problem of suitable sources" for radiation studies in the infrared region, Dr. Laine states.

• Science News Letter, 80:159 September 2, 1961

PSYCHOLOGY

Scientists Emotionally Involved in Their Work

➤ THE WIDELY held public image of the scientist as cold, detached, completely objective and impersonal about his work "could hardly be further from the truth," according to a Harvard University psychologist, Dr. Anne Roe.

The creative scientist in any field "is very deeply involved emotionally and personally in his work," and is himself his own most essential tool, she states.

The emotional process of developing new ideas and hypotheses usually commits the scientist to his theories in a very real sense, she reports in the journal, Science, 134:456, 1961.

"It (the hypothesis) is his baby. It is as much his creation as a painting is the personal creation of the painter."

Studies relating to the personality patterns of productive scientists, Dr. Roe notes, have shown them to be independent and open-minded, with a "strong liking for turning disorder into order." They also have strong egos and strong control over their impulses. They prefer interpersonal relations of low intensity and dislike interpersonal controversy in any form.

Scientists also show "much stronger preoccupation with things and ideas than with people." They like to take calculated risks, but risks involving nature, not people, and risks not dependent on luck.

The work a scientist chooses and the way he works "are intimately related to what he is and to his deepest needs," she says. "The more deeply engaged he is, the more profoundly is this true."

• Science News Letter, 80:159 September 2, 1961

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NATIONAL GEOGRAPHIC MAGAZINES, 1888-1960, any issue. Periodical Service, Box 465-SN., Wilmington, Delaware.

NEW ELECTRIC THERMOMETER—INDICATES temperature remotely to 3000 ft. and up to five locations. Measures temperature of air, liquids, outside humidity. For students, science teachers, amateur weather men, orchard men, storage men. Send for brochure. Electra-Temp. Co., Dept. S, Box 6111, San Diego 6, California.

RECHARGEABLE NICKEL CADMIUM BATTERY, penlight type, complete with Charger $10.75. Charger may also be used to recharge many hearing-aid batteries. Free information. Fry Electronics, Six Park Avenue, East Greenbush, New York.

New Ideas and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1107. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

MOISTURE METER, weighing four ounces, is a practical aid to gardeners that instantly tells when and how much to water lawns, house plants and shrubs. The meter, inserted into the soil by means of a prong attachment, indicates wet, moist or dry, showing the amount of deep-root water present.

• Science News Letter, 80:160 September 2, 1961

RING BARB NAILS have deep annular grooves with a holding power superior to smooth shank nails. In home construction, they assure squeak-proof floor sheathing free from buckling and nail pops, with fewer nails per board required. The nails are also suitable for applying cedar shakes and siding, and for crating and pallet making. They are available in different sizes and finishes.

• Science News Letter, 80:160 September 2, 1961

FIRE ALARM that detects fires before they can spread dangerously, is entirely self-contained and operated by two standard flashlight batteries. The alarm, which sounds when temperatures reach 135 to 140 degrees Fahrenheit, can be heard one-fifth of a mile away. Only 2¼ by 5½ by 1½ inches in size, it can be hung on any wall like a thermostat.

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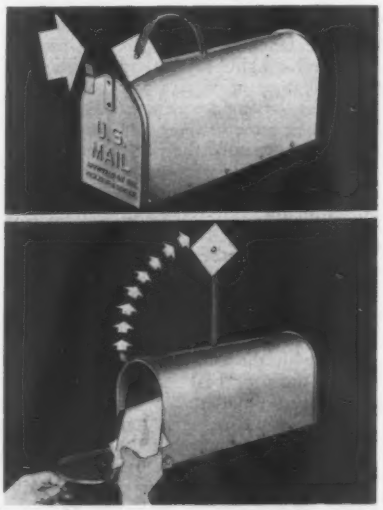
MAIL SIGNAL, shown in the photograph, consists of a 3-by-3-inch, bright



yellow, metal square fastened to an eight-inch rustproof coil spring. It is attached by a nut and bolt to the box top. In use, the signal is pulled toward the box door and a corner inserted between the edge of the door and the box. When box is opened, it springs up to signal arrival of the mail.

• Science News Letter, 80:160 September 2, 1961

AUTOMOBILE MODELS SET features a computer that enables the user to design and build over 25,000 different plastic automobile models. Containing enough parts to build two complete cars, 14 inches long and 4 inches high, at one side, the model can be snapped together and taken apart at will. Reusable decals for customizing the models are included.

• Science News Letter, 80:160 September 2, 1961

BOOK PRESERVATIVE restores old and prized leather, cloth and paper bound books. A clear solution containing no dyes, it is a penetrating fluid absorbed into the surface which can then be waxed or polished. One pint will treat about 25 books.

• Science News Letter, 80:160 September 2, 1961

SELF-ADHESIVE URETHANE FOAM is pressure-sensitive and adheres to any clean, dry surface after removal of its paper backing. Resistant to water, oils, chemicals, mildew and termites, it is useful in weather stripping and a variety of cushioning, insulating and sealing applications, for both home and industry. It is available in various sizes, shapes and colors.

• Science News Letter, 80:160 September 2, 1961

CARTON-SIZER quickly and efficiently reduces the size of a corrugated shipping carton too large for its contents. By scoring the sidewalls of the carton, the hand tool permits folding the top down to the desired depth.

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Nature Ramblings

➤ TURTLES in general are among the strangest animal anomalies that have been evolved in the course of nature. They are the only surviving reptiles with anything like a complete external bony armor, although the horny plates in the alligator's skin recall the days of the Mesozoic era when armored animals were more common.

Turtles have no teeth, but a horny-edged beak, like that of the birds. Before they are hatched but just about to break out into the world, young turtles show another relationship to birds—the beak ends in a pronounced knob that resembles a single saw tooth sticking up on the beak. It is useful in breaking the shell and soon after hatching it disappears.

Probably the most violent-tempered of the turtle tribe is the snapper, noted for fierce persistence in hanging on to an object once it has been gripped. Various species of snapping turtles are distributed throughout North America, from Canada to Panama. Although they never approach the size of the huge tortoises of the sea, some of these snappers become formidable enough,

Turtles

attaining a length of three feet and a weight of 40 pounds.

Within a few weeks turtles of all kinds will begin plodding across the half-dried marshes and fall-plowed fields to search for a very important spot. The time is approaching when turtles, like all reptiles, must get underground for a few months, and each must seek suitable winter quarters. When they find the right place, they will dig down and disappear for the duration of winter.

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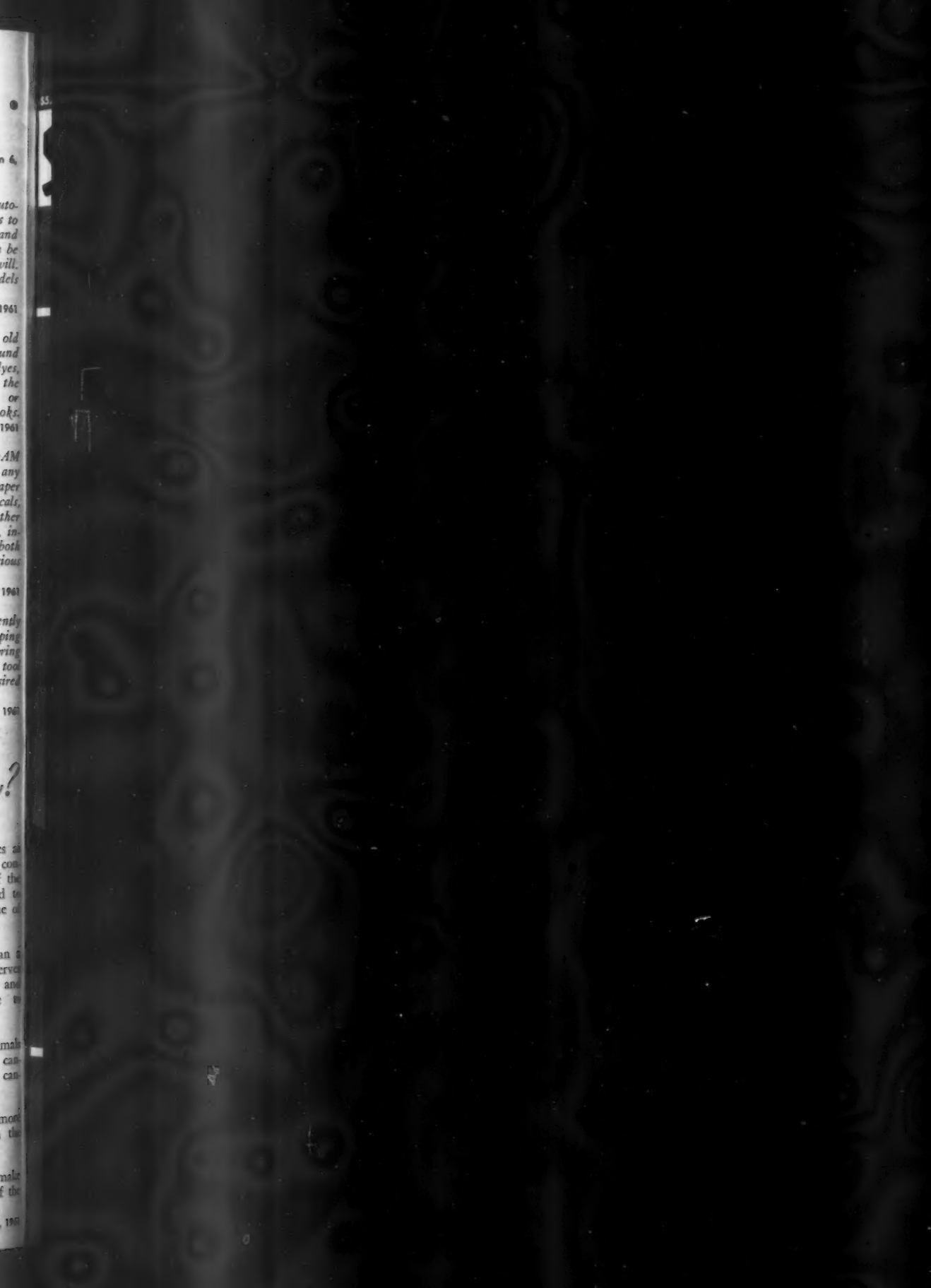
Do You Know?

An artificial *rumen* which duplicates as nearly as possible in the laboratory the conditions which occur in the stomach of the living cow or sheep has been devised to help in determining the nutritive value of forages.

A tiny piece of glass, no larger than a quarter-inch segment of pencil lead, serves as a "watchdog" to warn doctors and scientists against excessive exposure to *radiation*.

The *blood* and certain tissues of animals spontaneously "cured" of transplanted cancers contain cells that arrest the same cancer in other animals.

In 1960 for the first time in history more *cotton* was harvested by machines in the United States than by humans.

The *firefly's* glow is being used to make some of the first direct observations of the fuel system of the heart.

• Science News Letter, 80:160 September 2, 1961